**WHAT IS CLAIMED IS:**

1. A method for determining a distal cut thickness and posterior cut thickness for a femur in a knee replacement operation, the method comprising:

performing a tibial cut on a tibia;

performing soft tissue balancing based on a desired limb alignment;

measuring an extension gap between said femur and said tibial cut while in extension;

measuring a flexion gap between said femur and said tibial cut while in flexion;

calculating a distal cut thickness and a posterior cut thickness for said femur using said extension gap and said flexion gap and taking into account a distal thickness and posterior thickness of a femoral implant; and

performing a femoral cut according to said distal cut thickness and said posterior cut thickness.

2. A method as claimed in claim 1, wherein said distal cut thickness and said posterior cut thickness are calculated such that a post-cut gap from said tibia to said femur is equal in extension and in flexion.

3. A method as claimed in claim 2, wherein said performing a tibial cut comprises obtaining a tibial cut that is substantially perpendicular to a mechanical axis of said limb.

4. A method as claimed in claim 3, wherein said performing a tibial cut comprises using a positioning device to align said substantially perpendicular cut.

5. A method as claimed in claim 1, wherein said performing a femoral cut comprises obtaining a femoral cut that is substantially parallel to said tibial cut such that said extension gap and said flexion gap are substantially rectangular after said femoral cut has been done.

6. A method as claimed in claim 1, wherein said taking into account a distal thickness and posterior thickness comprises selecting a femoral implant having a distal thickness and a posterior thickness such that a desired distal cut thickness and posterior cut thickness may be obtained.

7. A method as claimed in claim 1, further comprising creating a reference coordinate system in a computer aided surgery system for said femur and said tibia and registering said femur and said tibia to said reference coordinate system using tracking devices.

8. A method as claimed in claim 7, wherein said performing a tibial cut comprises registering said tibial cut to said reference coordinate system.

9. A method as claimed in claim 8, wherein said performing soft tissue balancing comprises spacing said femur and said tibia while in extension.

10. A method as claimed in claim 9, wherein said spacing comprises placing a tensor device between said femur and said tibia and tensing ligaments connecting said femur and said tibia.

11. A method as claimed in claim 8, wherein said desired limb alignment is based on a computed limb alignment.

12. A method as claimed in claim 8, wherein said measuring a flexion gap and measuring an extension gap comprises using said tracking devices to obtain said measurements.

13. A method as claimed in claim 12, wherein said measuring a flexion gap comprises determining a most posterior point of a reference of said femur on said reference coordinate system and measuring a distance between said tibial cut and said most posterior point of said femur.

14. A method as claimed in claim 13, wherein said registering said cut comprises creating a plane along said tibial cut on said reference coordinate system and said determining a most posterior point of a reference comprises raising said plane on said tibial cut until said most posterior point of said femur is reached.

15. A system for determining a distal cut thickness and posterior cut thickness for a femur in a knee replacement operation, said system comprising:

a computer memory for holding data relating to size and shape of at least one femoral implant;

a measurement module for measuring an extension gap between said femur and said tibia while in extension and a flexion gap between said femur and said tibia while in flexion and generating measurement data;

a computing module receiving said measurement data and calculating a distal cut thickness and a posterior cut thickness for said femur using said extension gap and said flexion gap and taking into account a distal thickness and posterior thickness of a femoral implant; and

an output device for outputting said measurement data and calculated data calculated by said computing module.

16. A system as claimed in claim 15, wherein said measurement module comprises:

a registration module for registering said femur and a tibia to a reference coordinate system for display on said output device; and

a tracking device for tracking motion of said femur and said tibia in said reference coordinate system.

17. A system as claimed in claims 15 or 16, wherein said computing module fixes said posterior cut thickness, said distal thickness, and said posterior thickness and calculates said distal cut thickness.

18. A system as claimed in any one of claims 15 to 17, wherein said computing module calculates said distal cut thickness and said posterior cut thickness such that a post-cut gap from said tibia to said femur is equal in extension and in

flexion.

19. A system as claimed in any one of claims 15 to 18, wherein said computing module considers a user-input minimum cut thickness to calculate said posterior cut thickness and said distal cut thickness.

20. A system as claimed in claim 15, wherein said computing module adds said flexion gap measurement to a femoral implant size constant and subtracts said extension gap measurement to calculate said distal cut thickness.

21. A system as claimed in claim 20, wherein said femoral implant size constant takes into account a distal thickness of said femoral implant.

22. A system as claimed in claim 21, wherein said femoral implant size constant takes into account a posterior thickness of said femoral implant.

23. A system as claimed in claim 15, wherein said measurement module measures an actual mechanical axis of said femur and said tibia and said computing module determines an adjustment to be performed on soft tissues of said knee to obtain soft tissue balancing of said knee such that said knee is substantially aligned with a desired mechanical axis.

24. A system as claimed in claim 23, wherein said output device displays said desired mechanical axis superimposed on images corresponding to said femur and tibia.

25. A system as claimed in claim 16, wherein said registration module comprises a digitizer to register a surface of said femur and said tibia to said reference coordinate system.

26. A system as claimed in claim 25, wherein said registration module comprises markers for attachment to said femur and said tibia.

27. A system as claimed in claim 26, wherein said tracking device comprises an infrared camera and wherein said markers are infrared reflectors.